

## Making Measurement and Evaluation Courses More Appealing and Effective 3/9/2009

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Univ of North Texas  
Phil Bishop  
Univ of Alabama



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## Purpose

- Provide assistance to measurement and evaluation course teachers

### Premises:

- Not many measurement specialists
- Students not always
  - Excited
  - Mathematically-oriented



## Issues to Students

- Often M&E is REQUIRED
  - Teachers/Ex Sci
- Relevance is requisite
  - Field trips/ guest speakers
    - Medical labs
    - Coaches
    - PTs
    - Fitness club managers



## Measurement as a Life Skill

- Much of life rewards good measurement skills
  - Consumerism
  - Management
  - Teaching
  - Decision making
- Poor measurement ability can cost:
  - Money
  - Safety



## Example: Consumerism

- Measurement Issues in Purchasing an auto:
  - Price, Insurance costs
    - (e.g., more expensive = higher cost)
  - Repair/parts costs
  - Gas economy
  - others



## Measurement and Evaluation



James R. Morrow, Jr.  
University of North Texas



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## Measurement and Evaluation

### Today's format

- Interactive
- We don't have all the answers
- You have questions & answers
- Tell you our experiences
- Jump in whenever



## James R. Morrow, Jr.

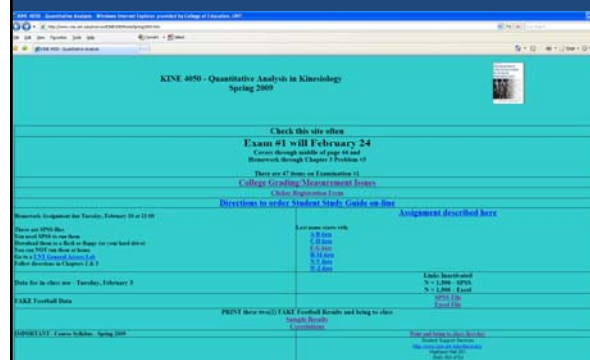
- BS & MS
  - Physical Education
- PhD
  - Research and Evaluation Methodology
- University of Houston
- University of North Texas
- Measurement/Research/Evaluation/Statistics
  - 33 years
    - 100s of classes
    - 1,000s of students

## Quantitative Analysis in Kinesiology

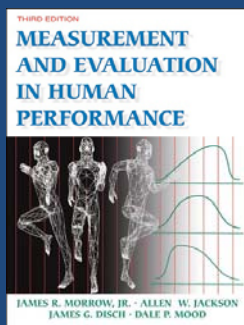
- Required
  - 3 SCH
- Juniors/Seniors
- “Statistics”
  - No it isn't!
- Do NOT like the “thought”
- Instructor/Course reputation



## Quantitative Analysis in Kinesiology



## Quantitative Analysis in Kinesiology



## Quantitative Analysis in Kinesiology

- Career options
  - Physical Therapy
  - Athletic Training
  - Coaching
  - Personal Training
  - Teaching
  - General kinesiology



## Slide 8

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**CeD2** Jim, I can cover as much of this as you want. Will save you some time.  
College of Education, 3/9/2009

## Quantitative Analysis in Kinesiology

- FIRST Day
  - Prepare them
  - Basic algebra quiz
  - TA “tells” them
    - “Dr. Morrow, Why don’t they believe you?”
  - What have others said
    - “From the horses’ mouths”



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## Quantitative Analysis in Kinesiology

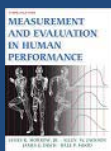
- “Why do I need to take this course?”
  - Decision making
  - Assessment
    - Psychomotor
    - Cognitive
    - Affective
  - Reliability/Validity
    - In ALL phases of life
    - In EVERY class



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## Quantitative Analysis in Kinesiology

- On-line Resources
  - Chapter
    - Outline
    - Selected Answers to Mastery Items
    - Homework Problems
    - Selected Homework Answers
    - Quizzes
    - Related Links
    - Data Matrixes



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## Quantitative Analysis in Kinesiology

- Class Activities
  - Daily quiz
    - Extra credit
      - Previous day
  - Lecture
    - Interactive
  - Q&A



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## Measurement and Evaluation

- Dataset
  - Create with class
  - Same dataset throughout
    - True and/or “adjusted” variables
  - Descriptive statistics
  - Inferential statistics
  - Reliability/Validity/Objectivity
    - Norm-referenced
    - Criterion-referenced

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## Measurement and Evaluation

- Make it interesting
  - Texas Youth Fitness Assessment
  - Newspaper articles
  - Sports
    - Parade Magazine All-Americans
  - Create data
    - Pedometers
    - Racquetball
    - Basketball
    - Tennis
    - Written test



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## Measurement and Evaluation

- Examples
  - Personal experiences
    - Real, contrived, combined
  - Flying Saucer experience
  - Cheating
  - Ask for their “insight”



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## Measurement and Evaluation

- Suggestions
  - Make it fun!
  - Practice, practice, practice
  - Contemporary/News
  - Large datasets
  - Read the literature
    - PubMed abstracts
  - Test manual interpretation



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## Measurement and Evaluation



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## Measurement and Evaluation

### Median

SENATE COMMITTEE/CHAIR	AGE
Appropriations/Sen. Daniel Inouye (D., Hawaii)	84
Veterans' Affairs/Sen. Daniel Akaka (D., Hawaii)	84
Health, Education, Labor & Pensions/ Sen. Edward Kennedy (D., Mass.)	76
Armed Services/Sen. Carl Levin (D., Mich.)	74
Aging/Sen. Herb Kohl (D., Wis.)	73
Median age in U.S. Senate: 63	
Median age in U.S.: 36.7	

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## Measurement and Evaluation

### Current Literature

NCBI PubMed A service of the U.S. National Library of Medicine and the National Institutes of Health www.pubmed.gov

Search: PubMed for "physical activity" tracking Go Clear Advanced Search Save Search

Display: Summary Show 20 Sort By Send to All 143 Review 22

Items 1 - 20 of 143 Page 1 of 8 Results found in article titles

Tracking of obesity and physical activity from childhood to adulthood: The Physical Activity Longitudinal Study.

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## Measurement and Evaluation

- After examinations
  - Model behaviors
    - Descriptive statistics
    - Inferential statistics
    - Reliability/Validity
    - Item analysis
      - Construct validity



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**TEXAS YOUTH EVALUATION PROJECT (2008)**  
2,596,565 Students

Grade	Total # of Students			FITNESSGRAM® Test (Achieved "Healthy Fitness Zone" in all 6 tests) %		
	Total	Girls	Boys	Total	Girls	Boys
3	327,946	160,929	167,017	98.101	32.09 ↔ 27.64	
4	320,123	157,232	162,891	76,917	27.4 ↔ 20.36	
5	314,035	154,865	159,170	64,050	23.03 ↔ 17.29	
6	292,849	144,379	148,470	58,788	22.59 ↔ 17.1	
7	281,334	138,295	143,039	53,975	20.93 ↔ 16.93	
8	259,102	126,185	132,917	47,751	18.7 ↔ 17.55	
9	263,517	126,607	136,910	37,516	13.4 ↔ 14.4	
10	212,562	103,453	109,109	27,222	11.94 ↔ 13.12	
11	178,583	87,778	90,805	20,055	10.25 ↔ 11.71	

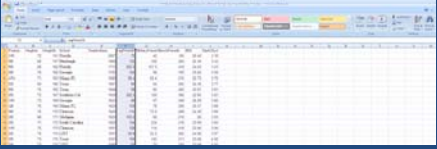
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	Total	Girls	Boys	Total	Girls	Boys
3					32.09	27.64
4					27.4	20.36
5					23.03	17.29
6					22.59	17.1
7					20.93	16.93
8					18.7	17.55
9					13.4	14.4
10	212,562	103,453	109,109	27,222	11.94	13.12
11	178,583	87,778	90,805	20,055	10.25	11.71

**Quantitative Analysis in Kinesiology**



The Predictive Analytics Company



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SPSS Data Editor

File Edit View Data Transform Analyze Graphs Window Help

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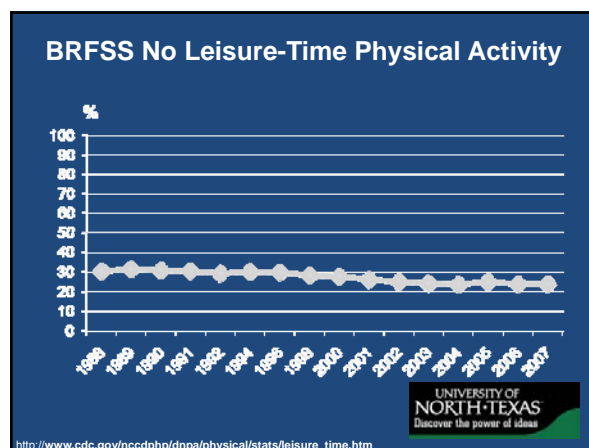
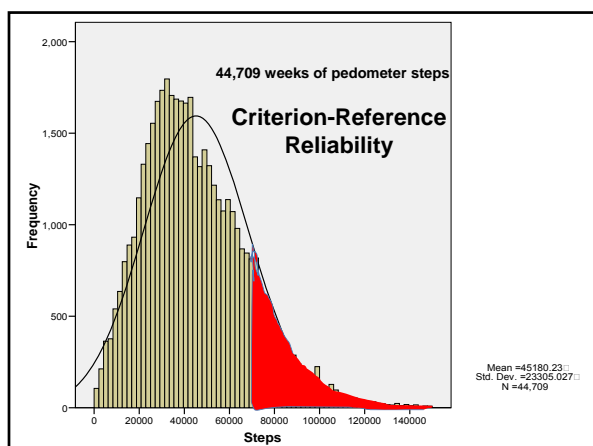
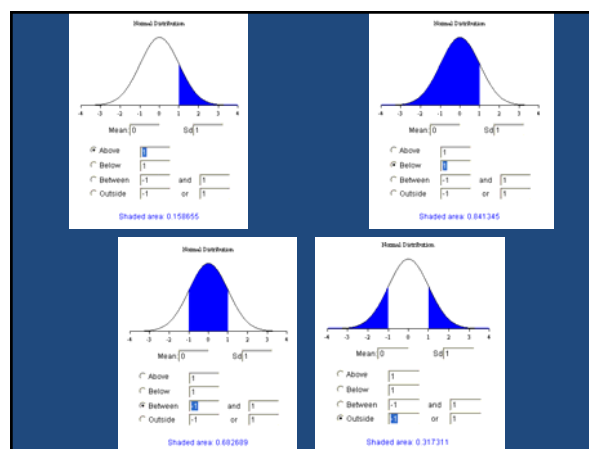
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trial1217

## Rice Virtual Lab in Statistics

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<http://onlinestatbook.com/index.html>

## Measurement and Evaluation

- Didn't work
  - Collecting homework
  - Group projects
    - Data collection & analyses

## Quantitative Analysis in Kinesiology

- “Clicker” Award
- Experimental
- New technology



UNT KHPR colleagues and students

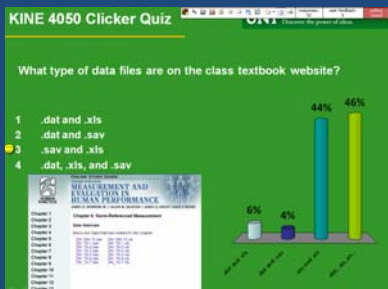


## Quantitative Analysis in Kinesiology

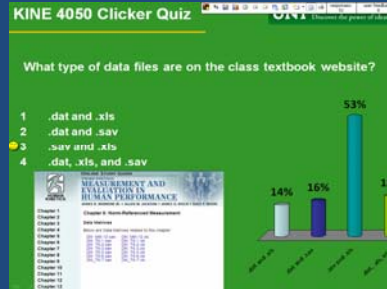
### Turning Point™ 101



## Measurement and Evaluation



## Measurement and Evaluation



## Course/Instructor Evaluation

- Daily quizzes
  - Disappointed
- “Clickers”
- Daily student evaluations
  - Anonymous
    - Student representative
- Traditional College/Department-wide teacher evaluations
- Individual input
  - Last class day
  - Anonymous
  - Next class reads



## Measurement and Evaluation

### Phil Bishop





## Remember

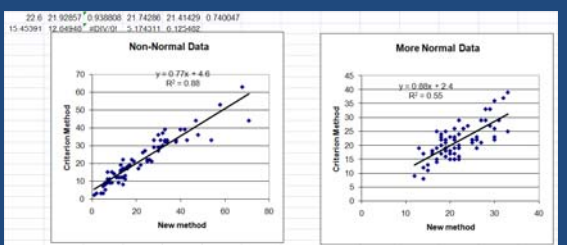
- Interactive
- Not any smarter or more experienced than you (just need travel money)
- Please contribute

## Overcoming Statistical Terror

- Slowly weave in statistics
  - Early exposure to distributions and SDs
    - Value of normal distributions
    - Applications of SDs > purchasing uniforms
- Create the need, then introduce the skill
- Keep it simple
  - What is vital to evaluating measurements?
  - Practice on real issues

## Is Excel enough?

- Descriptives
- T-tests, Pearson, figures
- Better to be comfortable a little...



## A Practical Experience in Valid/Reliable Measurements

- Divide into teams (In class)
- Assign a measurement task
  - E.g., handgrip strength and endurance
  - Most fitness tests (sit and reach)
  - Two-point touch
- Collect data
  - (e.g., strength and endurance)



## Relevance: Cheerleader selection Class from Hell

- Divide into teams
- Identify Criteria
- Design a selection system (evaluation)
  - Part and whole assessment
  - Evaluation forms
- Critique each other (evaluation)



## Practical Experience: Cont'd

- Enter data into spreadsheet (skill application)
- Use statistical skills to:
  - Evaluate test-retest reliability
  - (ICCR, t-tests, Bland-Altman)
- Use Qualitative skills to evaluate the use of the measurement
- Make an evaluative conclusion
  - (Top of Bloom's Taxonomy)
- Critique each other (evaluation)



## Practical Experience at Measuring

- Giving Fitness tests
- Giving Motor skills tests



## Standard Scores

- Example: Power lifting
- Ex: Firefighter Apparel Case
- Ex: Super Star competition

## M&E Pedagogy

- Evaluation of test item types
  - Bloom's taxonomy
  - Pros and cons
  - Real-life skills

## Other Measurements

- Sports
  - Ex.: steeplechase, # games played
- Coaching (NFL testing)
- Outdoors (hunting /fishing)
- Research

## In the END...

- Are my students competent in professional M&E?
- Do they feel competent?
- It's better to really learn a little, than "spec and dump"
- Create life-long learners, confident, competent, know when they need help

- Questions



- Suggestions



- Donations

